

July 15, 2016

Meagan E. Ormand
Golder Associates Inc.
2108 W. Laburnum Ave.
Suite 200
Richmond, VA 23227

RE: Project: Bremo Weekly Process
Pace Project No.: 92304700

Dear Meagan Ormand:

Enclosed are the analytical results for sample(s) received by the laboratory on July 12, 2016. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

Analyses were performed at the Pace Analytical Services location indicated on the sample analyte page for analysis unless otherwise footnoted.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Nicole Gasiorowski
nicole.gasiorowski@pacelabs.com
Project Manager

Enclosures

cc: Ron DiFrancesco, Golder Associates Inc.
Martha Smith, Golder Associates Inc.
Mike Williams, Golder Associates Inc



REPORT OF LABORATORY ANALYSIS

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CERTIFICATIONS

Project: Bremo Weekly Process
Pace Project No.: 92304700

Ormond Beach Certification IDs

8 East Tower Circle, Ormond Beach, FL 32174
Alabama Certification #: 41320
Connecticut Certification #: PH-0216
Delaware Certification: FL NELAC Reciprocity
Florida Certification #: E83079
Georgia Certification #: 955
Guam Certification: FL NELAC Reciprocity
Hawaii Certification: FL NELAC Reciprocity
Illinois Certification #: 200068
Indiana Certification: FL NELAC Reciprocity
Kansas Certification #: E-10383
Louisiana Certification #: FL NELAC Reciprocity
Louisiana Environmental Certificate #: 05007
Maryland Certification: #346
Michigan Certification #: 9911
Mississippi Certification: FL NELAC Reciprocity
Missouri Certification #: 236
Montana Certification #: Cert 0074

Nebraska Certification: NE-OS-28-14
Nevada Certification: FL NELAC Reciprocity
New York Certification #: 11608
North Carolina Environmental Certificate #: 667
North Carolina Certification #: 12710
North Dakota Certification #: R-216
Oklahoma Certification #: D9947
Pennsylvania Certification #: 68-00547
Puerto Rico Certification #: FL01264
South Carolina Certification: #96042001
Tennessee Certification #: TN02974
Texas Certification: FL NELAC Reciprocity
US Virgin Islands Certification: FL NELAC Reciprocity
Virginia Environmental Certification #: 460165
Wyoming Certification: FL NELAC Reciprocity
West Virginia Certification #: 9962C
Wisconsin Certification #: 399079670
Wyoming (EPA Region 8): FL NELAC Reciprocity

Charlotte Certification IDs

9800 Kinsey Ave. Ste 100, Huntersville, NC 28078
North Carolina Drinking Water Certification #: 37706
North Carolina Field Services Certification #: 5342
North Carolina Wastewater Certification #: 12

South Carolina Certification #: 99006001
Florida/NELAP Certification #: E87627
Kentucky UST Certification #: 84
Virginia/VELAP Certification #: 460221

Asheville Certification IDs

2225 Riverside Drive, Asheville, NC 28804
Florida/NELAP Certification #: E87648
Massachusetts Certification #: M-NC030
North Carolina Drinking Water Certification #: 37712

North Carolina Wastewater Certification #: 40
South Carolina Certification #: 99030001
Virginia/VELAP Certification #: 460222

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: Bremo Weekly Process

Pace Project No.: 92304700

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
92304700001	T2-160711-2141-S3	EPA 1664B	JMS	1	PASI-C
		EPA 200.7	RVK	1	PASI-O
		Trivalent Chromium Calculation	CKJ	1	PASI-O
		EPA 200.8	CKJ	10	PASI-O
		EPA 245.1	WAB	1	PASI-A
		SM 2540D	ALC	1	PASI-A
		EPA 218.7	AEM	1	PASI-O
		EPA 350.1	AES2	1	PASI-A
		SM 4500-CI-E	AES2	1	PASI-A

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: Bremo Weekly Process

Pace Project No.: 92304700

Method: EPA 1664B

Description: HEM, Oil and Grease

Client: Golder_Dominion_Bremo

Date: July 15, 2016

General Information:

1 sample was analyzed for EPA 1664B. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: Bremo Weekly Process

Pace Project No.: 92304700

Method: EPA 200.7

Description: 200.7 MET ICP

Client: Golder_Dominion_Bremo

Date: July 15, 2016

General Information:

1 sample was analyzed for EPA 200.7. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:

The samples were prepared in accordance with EPA 200.7 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: Bremo Weekly Process

Pace Project No.: 92304700

Method: Trivalent Chromium Calculation

Description: Trivalent Chromium Calculation

Client: Golder_Dominion_Bremo

Date: July 15, 2016

General Information:

1 sample was analyzed for Trivalent Chromium Calculation. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: Bremo Weekly Process

Pace Project No.: 92304700

Method: EPA 200.8

Description: 200.8 MET ICPMS

Client: Golder_Dominion_Bremo

Date: July 15, 2016

General Information:

1 sample was analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:

The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: Bremo Weekly Process
Pace Project No.: 92304700

Method: EPA 245.1
Description: 245.1 Mercury
Client: Golder_Dominion_Bremo
Date: July 15, 2016

General Information:

1 sample was analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:

The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: Bremo Weekly Process

Pace Project No.: 92304700

Method: SM 2540D

Description: 2540D TSS, Low-Level

Client: Golder_Dominion_Bremo

Date: July 15, 2016

General Information:

1 sample was analyzed for SM 2540D. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

QC Batch: 321163

D6: The precision between the sample and sample duplicate exceeded laboratory control limits.

- DUP (Lab ID: 1779705)
 - Total Suspended Solids
- DUP (Lab ID: 1779706)
 - Total Suspended Solids

Additional Comments:

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: Bremo Weekly Process

Pace Project No.: 92304700

Method: EPA 218.7

Description: Hexavalent Chromium by IC

Client: Golder_Dominion_Bremo

Date: July 15, 2016

General Information:

1 sample was analyzed for EPA 218.7. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: Bremo Weekly Process

Pace Project No.: 92304700

Method: EPA 350.1

Description: 350.1 Ammonia

Client: Golder_Dominion_Bremo

Date: July 15, 2016

General Information:

1 sample was analyzed for EPA 350.1. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: Bremo Weekly Process
Pace Project No.: 92304700

Method: SM 4500-CI-E
Description: 4500 Chloride
Client: Golder_Dominion_Bremo
Date: July 15, 2016

General Information:

1 sample was analyzed for SM 4500-CI-E. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 321155

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 92304282001,92304706001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1779651)
 - Chloride
- MSD (Lab ID: 1779652)
 - Chloride

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: Bremo Weekly Process

Pace Project No.: 92304700

Sample: T2-160711-2141-S3		Lab ID: 92304700001		Collected: 07/11/16 21:41		Received: 07/12/16 14:02		Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual	
Field Data		Analytical Method:							
Collected By	L.Hamelman			1		07/11/16 21:51			
Collected Date	07/11/16			1		07/11/16 21:51			
Collected Time	21:41			1		07/11/16 21:51			
Field pH	7.9	Std. Units	0.10	1		07/11/16 21:51			
HEM, Oil and Grease		Analytical Method: EPA 1664B							
Oil and Grease	ND	mg/L	5.0	1		07/14/16 09:16			
200.7 MET ICP		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Tot Hardness asCaCO3 (SM 2340B	93000	ug/L	3300	1	07/14/16 06:44	07/14/16 14:24			
Trivalent Chromium Calculation		Analytical Method: Trivalent Chromium Calculation							
Chromium, Trivalent	ND	ug/L	5.0	1		07/14/16 09:18	16065-83-1		
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	ND	ug/L	5.0	1	07/13/16 12:40	07/13/16 18:26	7440-36-0		
Arsenic	50.0	ug/L	5.0	1	07/13/16 12:40	07/13/16 18:26	7440-38-2		
Cadmium	ND	ug/L	1.0	1	07/13/16 12:40	07/13/16 18:26	7440-43-9		
Copper	ND	ug/L	5.0	1	07/13/16 12:40	07/13/16 18:26	7440-50-8		
Lead	ND	ug/L	5.0	1	07/13/16 12:40	07/13/16 18:26	7439-92-1		
Nickel	ND	ug/L	5.0	1	07/13/16 12:40	07/13/16 18:26	7440-02-0		
Selenium	ND	ug/L	5.0	1	07/13/16 12:40	07/13/16 18:26	7782-49-2		
Silver	ND	ug/L	0.40	1	07/13/16 12:40	07/13/16 18:26	7440-22-4		
Thallium	ND	ug/L	1.0	1	07/13/16 12:40	07/13/16 18:26	7440-28-0		
Zinc	ND	ug/L	25.0	1	07/13/16 12:40	07/13/16 18:26	7440-66-6		
245.1 Mercury		Analytical Method: EPA 245.1 Preparation Method: EPA 245.1							
Mercury	ND	ug/L	0.10	1	07/13/16 12:00	07/13/16 15:20	7439-97-6		
2540D TSS, Low-Level		Analytical Method: SM 2540D							
Total Suspended Solids	7.7	mg/L	1.0	1		07/14/16 10:17			
Hexavalent Chromium by IC		Analytical Method: EPA 218.7							
Chromium, Hexavalent	ND	ug/L	1.0	1		07/13/16 13:41	18540-29-9		
350.1 Ammonia		Analytical Method: EPA 350.1							
Nitrogen, Ammonia	ND	mg/L	0.20	1		07/14/16 11:39	7664-41-7		
4500 Chloride		Analytical Method: SM 4500-Cl-E							
Chloride	20.7	mg/L	5.0	1		07/14/16 12:31	16887-00-6		

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: Bremo Weekly Process

Pace Project No.: 92304700

QC Batch: 321130

Analysis Method: EPA 1664B

QC Batch Method: EPA 1664B

Analysis Description: 1664 HEM, Oil and Grease

Associated Lab Samples: 92304700001

METHOD BLANK: 1779574

Matrix: Water

Associated Lab Samples: 92304700001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Oil and Grease	mg/L	ND	5.0	07/14/16 09:13	

LABORATORY CONTROL SAMPLE: 1779575

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Oil and Grease	mg/L	40	37.9	95	78-114	

MATRIX SPIKE SAMPLE: 1779576

Parameter	Units	35253049001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Oil and Grease	mg/L	1.1U	40	33.5	84	78-114	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: Bremo Weekly Process
Pace Project No.: 92304700

QC Batch: 320985 Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury
Associated Lab Samples: 92304700001

METHOD BLANK: 1778669 Matrix: Water
Associated Lab Samples: 92304700001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	ug/L	ND	0.10	07/13/16 15:01	

LABORATORY CONTROL SAMPLE: 1778670

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	2.5	2.8	112	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1778671 1778672

Parameter	Units	92304706001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Mercury	ug/L	ND	2.5	2.5	2.8	2.8	109	109	70-130	0	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: Bremo Weekly Process
Pace Project No.: 92304700

QC Batch:	308592	Analysis Method:	EPA 200.7
QC Batch Method:	EPA 200.7	Analysis Description:	200.7 MET
Associated Lab Samples:	92304700001		

METHOD BLANK: 1635371 Matrix: Water
Associated Lab Samples: 92304700001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Tot Hardness asCaCO3 (SM 2340B	ug/L	ND	3300	07/14/16 13:56	

LABORATORY CONTROL SAMPLE: 1635372

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Tot Hardness asCaCO3 (SM 2340B	ug/L	82700	78500	95	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1635373 1635374

Parameter	Units	92304692001		MS		MSD		MS		MSD		% Rec Limits	RPD	Qual
		Result	Conc.	Spike Conc.	Spike Conc.	Result	Result	% Rec	% Rec					
Tot Hardness asCaCO3 (SM 2340B	ug/L	90700	82700	82700	171000	170000	97	96	70-130	0				

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: Bremo Weekly Process
Pace Project No.: 92304700

QC Batch: 308587 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 92304700001

METHOD BLANK: 1635274 Matrix: Water
Associated Lab Samples: 92304700001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Antimony	ug/L	ND	5.0	07/13/16 17:58	
Arsenic	ug/L	ND	5.0	07/13/16 17:58	
Cadmium	ug/L	ND	1.0	07/13/16 17:58	
Copper	ug/L	ND	5.0	07/13/16 17:58	
Lead	ug/L	ND	5.0	07/13/16 17:58	
Nickel	ug/L	ND	5.0	07/13/16 17:58	
Selenium	ug/L	ND	5.0	07/13/16 17:58	
Silver	ug/L	ND	0.40	07/13/16 17:58	
Thallium	ug/L	ND	1.0	07/13/16 17:58	
Zinc	ug/L	ND	25.0	07/13/16 17:58	

LABORATORY CONTROL SAMPLE: 1635275

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	50	47.9	96	85-115	
Arsenic	ug/L	50	50.3	101	85-115	
Cadmium	ug/L	5	4.9	99	85-115	
Copper	ug/L	50	51.5	103	85-115	
Lead	ug/L	50	49.5	99	85-115	
Nickel	ug/L	50	51.0	102	85-115	
Selenium	ug/L	50	49.4	99	85-115	
Silver	ug/L	5	5.0	100	85-115	
Thallium	ug/L	50	47.5	95	85-115	
Zinc	ug/L	250	252	101	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1635276 1635277

Parameter	Units	92304818004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Antimony	ug/L	3.7	50	50	49.9	49.2	92	91	70-130	1	
Arsenic	ug/L	53.8	50	50	51.4	50.3	-5	-7	70-130	2	M1
Cadmium	ug/L	ND	5	5	4.9	4.8	98	95	70-130	3	
Copper	ug/L	ND	50	50	48.9	47.6	96	93	70-130	3	
Lead	ug/L	ND	50	50	50.8	50.2	101	100	70-130	1	
Nickel	ug/L	3.7	50	50	70.4	67.7	133	128	70-130	4	M1
Selenium	ug/L	11.4	50	50	56.9	56.0	91	89	70-130	2	
Silver	ug/L	ND	5	5	4.9	4.8	97	95	70-130	2	
Thallium	ug/L	ND	50	50	48.0	47.6	95	94	70-130	1	

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QUALITY CONTROL DATA

Project: Bremo Weekly Process

Pace Project No.: 92304700

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1635276 1635277											
Parameter	Units	92304818004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Zinc	ug/L	6.9	250	250	232	225	90	87	70-130	3	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: Bremo Weekly Process

Pace Project No.: 92304700

QC Batch: 321163

Analysis Method: SM 2540D

QC Batch Method: SM 2540D

Analysis Description: 2540D Total Suspended Solids

Associated Lab Samples: 92304700001

METHOD BLANK: 1779703

Matrix: Water

Associated Lab Samples: 92304700001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	1.0	07/14/16 10:16	

LABORATORY CONTROL SAMPLE: 1779704

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	250	246	98	90-110	

SAMPLE DUPLICATE: 1779705

Parameter	Units	92304706001 Result	Dup Result	RPD	Qualifiers
Total Suspended Solids	mg/L	1.8	1.7	6	D6

SAMPLE DUPLICATE: 1779706

Parameter	Units	92304854001 Result	Dup Result	RPD	Qualifiers
Total Suspended Solids	mg/L	94.5	63.5	39	D6

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QUALITY CONTROL DATA

Project: Bremo Weekly Process

Pace Project No.: 92304700

QC Batch: 308595

Analysis Method: EPA 218.7

QC Batch Method: EPA 218.7

Analysis Description: Chromium, Hexavalent IC

Associated Lab Samples: 92304700001

METHOD BLANK: 1635533

Matrix: Water

Associated Lab Samples: 92304700001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chromium, Hexavalent	ug/L	ND	1.0	07/13/16 12:36	

LABORATORY CONTROL SAMPLE: 1635534

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chromium, Hexavalent	ug/L	.075	.079J	106	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1635535 1635536

Parameter	Units	92304706001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Chromium, Hexavalent	ug/L	ND	.22	.22	.47J	.45J	114	108	85-115	3	

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QUALITY CONTROL DATA

Project: Bremo Weekly Process
Pace Project No.: 92304700

QC Batch: 321143 Analysis Method: EPA 350.1
QC Batch Method: EPA 350.1 Analysis Description: 350.1 Ammonia
Associated Lab Samples: 92304700001

METHOD BLANK: 1779605 Matrix: Water
Associated Lab Samples: 92304700001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrogen, Ammonia	mg/L	ND	0.20	07/14/16 11:29	

LABORATORY CONTROL SAMPLE: 1779606

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, Ammonia	mg/L	5	5.0	100	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1779607 1779608

Parameter	Units	92304706001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Nitrogen, Ammonia	mg/L	ND	5	5	4.8	4.8	97	97	90-110	0	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1779609 1779610

Parameter	Units	92304935001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Nitrogen, Ammonia	mg/L	1.2	5	5	6.1	6.1	98	98	90-110	0	

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QUALITY CONTROL DATA

Project: Bremo Weekly Process
Pace Project No.: 92304700

QC Batch: 321155 Analysis Method: SM 4500-Cl-E
QC Batch Method: SM 4500-Cl-E Analysis Description: 4500 Chloride
Associated Lab Samples: 92304700001

METHOD BLANK: 1779647 Matrix: Water
Associated Lab Samples: 92304700001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	ND	5.0	07/14/16 12:17	

LABORATORY CONTROL SAMPLE: 1779648

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	20	19.7	98	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1779649 1779650

Parameter	Units	92304706001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Chloride	mg/L	24.4	10	10	34.3	34.4	99	101	90-110	0	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1779651 1779652

Parameter	Units	92304282001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Chloride	mg/L	26.5	20	20	41.9	41.2	77	74	90-110	2 M1	

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REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: Bremo Weekly Process

Pace Project No.: 92304700

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

Acid preservation may not be appropriate for 2 Chloroethylvinyl ether, Styrene, and Vinyl chloride.

A separate vial preserved to a pH of 4-5 is recommended in SW846 Chapter 4 for the analysis of Acrolein and Acrylonitrile by EPA Method 8260.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-A Pace Analytical Services - Asheville

PASI-C Pace Analytical Services - Charlotte

PASI-O Pace Analytical Services - Ormond Beach

ANALYTE QUALIFIERS

D6 The precision between the sample and sample duplicate exceeded laboratory control limits.

M1 Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE


Project: Bremo Weekly Process

Pace Project No.: 92304700

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92304700001	T2-160711-2141-S3				
92304700001	T2-160711-2141-S3	EPA 1664B	321130		
92304700001	T2-160711-2141-S3	EPA 200.7	308592	EPA 200.7	308704
92304700001	T2-160711-2141-S3	Trivalent Chromium Calculation	308686		
92304700001	T2-160711-2141-S3	EPA 200.8	308587	EPA 200.8	308663
92304700001	T2-160711-2141-S3	EPA 245.1	320985	EPA 245.1	321000
92304700001	T2-160711-2141-S3	SM 2540D	321163		
92304700001	T2-160711-2141-S3	EPA 218.7	308595		
92304700001	T2-160711-2141-S3	EPA 350.1	321143		
92304700001	T2-160711-2141-S3	SM 4500-CI-E	321155		

REPORT OF LABORATORY ANALYSIS

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	Document Name:	Document Revised: May 24, 2016
	Sample Condition Upon Receipt(SCUR)	Page 1 of 2
	Document No.: F-MEC-CS-009-Rev.03	Issuing Authority: Pace Mechanicsville Quality Office

Page 2 of 2 for Internal Use ONLY

Sample Condition Upon Receipt

Client Name:

Goldier/Bremo

Project #:

WO# : 92304700


Courier:

☐ Commercial

☐ Fed Ex

☐ UPS

☐ USPS

☐ Client

☒ Pace

☐ Other:

Custody Seal Present?

☒ Yes

☐ No

Seals Intact?

☒ Yes

☐ No

Packing Material:

☐ Bubble Wrap

☒ Bubble Bags

☐ None

☐ Other:

Thermometer:

☒ RMD001

☐

Type of Ice:

☒ Wet

☐ Blue

☐ None

☒ Samples on ice, cooling process has begun

Correction Factor: 0.0°C

Cooler Temp Corrected (°C):

1.8

Biological Tissue Frozen?

☐ Yes

☐ No

☐ N/A

Temp should be above freezing to 6°C

USDA Regulated Soil (☐ N/A, water sample)

Did samples originate in a quarantine zone within the United States: CA, NY, or SC (check maps)?

☐ Yes ☐ No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☐ No

			Comments/Discrepancy:
Chain of Custody Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	1.	
Samples Arrived within Hold Time?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	2.	
Short Hold Time Analysis (<72 hr.)?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	3.	
Rush Turn Around Time Requested?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	4.	
Sufficient Volume?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	5.	
Correct Containers Used?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	6.	
-Pace Containers Used?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
Containers Intact?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	7.	
Samples Field Filtered?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	8.	Note if sediment is visible in the dissolved container
Sample Labels Match COC?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	9.	
-Includes Date/Time/ID/Analysis Matrix: <u>WIN</u>			
All containers needing acid/base preservation have been checked?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	10.	HNC3 pH<2 HCl pH<2 H2SO4 pH<2 NaOH pH>12 NaOH/ZnOAc pH>9
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO ₃ , H ₂ SO ₄ , HCl<2; NaOH >9 Sulfide, NaOH>12 Cyanide)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC,LLHg	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
Samples checked for dechlorination?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	11.	
Headspace in VOA Vials (>5-6mm)?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	12.	
Trip Blank Present?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	13.	
Trip Blank Custody Seals Present?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A		
Pace Trip Blank Lot # (if purchased):			

CLIENT NOTIFICATION/RESOLUTION

Field Data Required? ☐ Yes ☐ No

Person Contacted:

Date/Time:

Comments/Sample

Discrepancy:

Project Manager SCURF Review:

Date:

Project Manager SRF Review:

Date:

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. Out of hold, incorrect preservative, out of temp, incorrect containers)



CHAIN-OF-CUSTODY / Analytical Request Document
The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Section A Required Client Information: Company: **Golder Associates** Address: **2108 W Laburnum Ave, Ste 200 Richmond, VA 23227** Phone: **804-551-0129** Fax: **804-358-2900** Email To: **Mormand@golder.com** Requested Due Date/At: **24 Hours 3-Days**

Section B Required Project Information: Report To: **Mormand@golder.com** Copy To: **Martha_Smith@golder.com** Ron_Difrancesco@golder.com Purchase Order No.: Project Name: **Bremo Weekly Compliance Process** Project Number: **1520-347 220**

Section C Invoice Information: Attention: **Meagan Ormand** Company Name: **Golder Associates** Address: **galdadataentry_invoices@golder.com** Pace Quota Reference: **Pace Project Manager** Pace Profile #:

REGULATORY AGENCY: **NPDES** **GROUND WATER** **DRINKING WATER** **UST** **RCRA** **OTHER** Site Location: **VA** STATE: **VA**

Section D Required Client Information		Valid Matrix Codes		COLLECTED		PRESERVATIVES		ANALYSIS TEST		Residual Chlorine (Y/N)											
MATRIX CODE		CODE		COMPOSITE START		COMPOSITE END/GRAB		Analysis Test		Y/N											
SAMPLE ID (A-Z, 0-9 / -) Sample IDs MUST BE UNIQUE		DRINKING WATER WASTE WATER PRODUCT SOIL/SOLID OIL WIPE AIR OTHER TISSUE		DW WW P SL OL WP AR OT TS				200.8 - Sb, As, Cd, Cr (III) 200.8 - Pb, Ni, Se, Zn, Cu 200.8 - Ag, Th 245.1 - Hg 218.6(7) - Cr (VI) SM4500 - Chloride 1664B - Oil&Grease 350.1 - Ammonia-N SM2540D - TSS 200.7 - Hardness													
ITEM #	MATRIX CODE	SAMPLE TYPE (G=GRAB C=COMP)		DATE	TIME	DATE	TIME	SAMPLE TEMP AT COLLECTION		# OF CONTAINERS	Unpreserved	H ₂ SO ₄	HNO ₃	HCl	NaOH	Na ₂ S ₂ O ₃	Methanol	Other	Analysis Test		Y/N
1	12-160711-2141-S3	WW	C	4	4	7/11/16	21:41			10	X	X	X	X	X				X	200.8 - Sb, As, Cd, Cr (III)	X
2																				200.8 - Pb, Ni, Se, Zn, Cu	X
3																				200.8 - Ag, Th	X
4																				245.1 - Hg	X
5																				218.6(7) - Cr (VI)	X
6																				SM4500 - Chloride	X
7																				1664B - Oil&Grease	X
8																				350.1 - Ammonia-N	X
9																				SM2540D - TSS	X
10																				200.7 - Hardness	X
11																					
12																					
ADDITIONAL COMMENTS				RELINQUISHED BY / AFFILIATION				DATE	TIME	ACCEPTED BY / AFFILIATION				DATE	TIME	SAMPLE CONDITIONS					
All analyses to be performed under Golden-Pace MSA dated 12/19/2008				12/19/2008				07/12/16	1402	12/16/14				7:12-16:15	501.8	Y Y					

ADDITIONAL COMMENTS		RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
All analyses to be performed under Golder-Pace MSA dated 12/19/2008		<i>Meagan Ormand</i>	07/12/16	1402	<i>Meagan Ormand</i>	7/12/16	1402	Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
SAMPLER NAME AND SIGNATURE											
PRINT Name of SAMPLER:		<i>L. Howell</i>									
SIGNATURE of SAMPLER:		<i>L. Howell</i>									
DATE Signed (MM/DD/YY):		07/11/16									